

## CLAIMS

1. A process for producing bis- $\beta$ -hydroxyethyl terephthalate and/or a low condensate thereof from an aromatic polyester, comprising the steps of:

heating the aromatic polyester comprising terephthalic acid as a main dicarboxylic acid component and ethylene glycol as a main glycol component together with bis- $\beta$ -hydroxyethyl terephthalate and/or a low condensate thereof to pre-decompose the aromatic polyester; and then,

reacting the obtained pre-decomposed product with ethylene glycol to convert the terephthalic acid component of the pre-decomposed product into bis- $\beta$ -hydroxyethyl terephthalate and/or a low condensate thereof.

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2. The process of claim 1, wherein the pre-decomposition is carried out by heating the bis- $\beta$ -hydroxyethyl terephthalate and/or low condensate thereof to melt.

20 3. The process of claim 1, wherein the pre-decomposition is carried out at a temperature of 150 to 265°C.

4. The process of claim 1, wherein the pre-decomposition is carried out using 0.1 to 4.5 parts by weight of the bis- $\beta$ -hydroxyethyl terephthalate and/or condensate thereof based on 1 part by weight of the aromatic polyester.

25 5. The process of claim 1, wherein a reaction between the pre-decomposed product and ethylene glycol is carried out at a temperature of 190 to 265°C.

30 6. The process of claim 1, wherein a reaction between the pre-decomposed product and ethylene glycol is carried out using 1 part by weight of the pre-decomposed product and 0.3

to 10.0 parts by weight of ethylene glycol.

7. A process for producing bis- $\beta$ -hydroxyethyl terephthalate having a small content of ions, comprising the  
5 step of:

bringing a bis- $\beta$ -hydroxyethyl terephthalate solution composition comprising ethylene glycol, bis- $\beta$ -hydroxyethyl terephthalate and cations and/or anions as impurities into contact with a cation exchanger and/or an anion exchanger to  
10 reduce the total content of cations and anions as impurities to 50 ppm or less based on the bis- $\beta$ -hydroxyethyl terephthalate.

8. The process of claim 7, wherein the bis- $\beta$ -hydroxyethyl  
15 terephthalate solution composition contains cations and/or anions as impurities in a total amount of 3,000 ppm or less based on the bis- $\beta$ -hydroxyethyl terephthalate.

9. The process of claim 7, wherein the content of cations  
20 contained as impurities in the bis- $\beta$ -hydroxyethyl terephthalate solution composition is 2,500 ppm or less based on the bis- $\beta$ -hydroxyethyl terephthalate.

10. The process of claim 7, wherein the content of anions  
25 contained as impurities in the bis- $\beta$ -hydroxyethyl terephthalate solution composition is 500 ppm or less based on the bis- $\beta$ -hydroxyethyl terephthalate.

11. The process of claim 7, wherein the bis- $\beta$ -hydroxyethyl  
30 terephthalate solution composition contains bis- $\beta$ -hydroxyethyl terephthalate in an amount of 5 to 80 wt%.

12. The process of claim 7, wherein the cation exchanger is a cation exchange resin.

13. The process of claim 7, wherein the anion exchanger is an anion exchange resin.
- 5 14. The process of claim 7, wherein the bis- $\beta$ -hydroxyethyl terephthalate solution composition is brought into contact with a cation exchanger and then with an anion exchanger.
- 10 15. The process of claim 7, wherein the bis- $\beta$ -hydroxyethyl terephthalate solution composition is brought into contact with a cation exchanger and/or an anion exchanger at a temperature of 20 to 120° C.
- 15 16. A process for purifying bis- $\beta$ -hydroxyethyl terephthalate comprising the steps of:
  - (1) obtaining a crude bis- $\beta$ -hydroxyethyl terephthalate by subjecting a bis- $\beta$ -hydroxyethyl terephthalate-containing mixture containing cations and anions in a total amount of 50 ppm or less, ethylene glycol in an amount of more than 10 wt% and a compound having a boiling point lower than that of bis- $\beta$ -hydroxyethyl terephthalate to preliminary evaporation or distillation to distill off the compound having a boiling point lower than that of bis- $\beta$ -hydroxyethyl terephthalate; and then,
  - 25 (2) subjecting the crude bis- $\beta$ -hydroxyethyl terephthalate to evaporation or distillation under reduced pressure to separate purified bis- $\beta$ -hydroxyethyl terephthalate.
- 30 17. The purification process of claim 16, wherein the preliminary evaporation or distillation is carried out at a temperature of 170° C or less.
18. The purification process of claim 16, wherein the

preliminary evaporation or distillation is carried out at a reduced pressure (absolute pressure) of 40,000 Pa (300 mmHg) or less.

5 19. The purification process of claim 16, wherein the content of ethylene glycol in the crude bis- $\beta$ -hydroxyethyl terephthalate is reduced to 10 wt% or less by the preliminary evaporation or distillation.

10 20. The purification process of claim 16, wherein the evaporation or distillation under reduced pressure is carried out at a temperature of 130 to 250°C.

15 21. The purification process of claim 16, wherein the evaporation or distillation under reduced pressure is carried out at a reduced pressure (absolute pressure) of 300 Pa (2.25 mmHg) or less.

20 22. A process for purifying bis- $\beta$ -hydroxyethyl terephthalate comprising the step of:

subjecting crude bis- $\beta$ -hydroxyethyl terephthalate having a cation and anion total content of 50 ppm or less to evaporation or distillation under reduced pressure.

25 23. The purification process of claim 22, wherein the evaporation or distillation is carried out at a temperature of 130 to 250°C.

30 24. The purification process of claim 22, wherein the evaporation or distillation is carried out at a reduced pressure (absolute pressure) of 300 Pa (2.25 mmHg) or less.

25. The purification process of claim 22, wherein the crude bis- $\beta$ -hydroxyethyl terephthalate has a cation and anion total

content of 40 ppm or less.

26. The purification process of claim 22, wherein the crude bis- $\beta$ -hydroxyethyl terephthalate has a cation and anion total  
5 content of 30 ppm or less.

27. The purification process of claim 22, wherein the crude bis- $\beta$ -hydroxyethyl terephthalate is a product obtained by depolymerizing polyethylene terephthalate with ethylene  
10 glycol.

28. The purification process of claim 22, wherein the crude bis- $\beta$ -hydroxyethyl terephthalate is a product obtained by subjecting a reaction mixture obtained by depolymerizing  
15 polyethylene terephthalate with ethylene glycol to a cation removing treatment and/or an anion removing treatment.

29. The purification process of claims 7 or 28, wherein the reaction mixture is subjected to a decoloring treatment.  
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30. Purified bis- $\beta$ -hydroxyethyl terephthalate having a cation and anion total content of 15 ppm or less.

31. The purified bis- $\beta$ -hydroxyethyl terephthalate of claim  
25 30, which has a cation and anion total content of 5 ppm or less.

32. The purified bis- $\beta$ -hydroxyethyl terephthalate of claim  
30, which has a bis- $\beta$ -hydroxyethyl terephthalate content of  
30 97 wt% or more.

33. Use of the purified bis- $\beta$ -hydroxyethyl terephthalate of claim 30 for the production of polyethylene terephthalate.

34. A process for producing polyethylene terephthalate by polymerizing the purified bis- $\beta$ -hydroxyethyl terephthalate of claim 30 in the presence of a polycondensation catalyst.
- 5 35. A process for producing polyethylene terephthalate by polymerizing the purified bis- $\beta$ -hydroxyethyl terephthalate of claim 30 and terephthalic acid in the presence of a polycondensation catalyst.